

**CORRESPONDENCE/MEMORANDUM****State of Wisconsin**

DATE: December 23, 2021

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center

SUBJECT: Water Quality-Based Effluent Limitations for the Ashland Sewage Utility  
WPDES Permit No. WI-0030767-10-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Ashland Sewage Utility in Ashland County. This municipal wastewater treatment facility (WWTF) discharges to Chequamegon Bay of Lake Superior, located in the Fish Creek Watershed in the Lake Superior Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1, 2
BOD <sub>5</sub>			45 mg/L	30 mg/L	1
TSS			45 mg/L	30 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
<i>E. coli</i> Year round				126 #/100 mL geometric mean	3
Phosphorus Interim				1.0 mg/L	1, 4
Mercury (Total Recoverable)	11 ng/L				1, 5
Ammonia Nitrogen					1, 6
Arsenic (Total Recoverable)					6
Chloride					6
Copper (Total Recoverable)					6
Hexachlorobenzene					6
TKN, Nitrate+Nitrite, and Total Nitrogen					7
Acute WET					1, 8
Chronic WET					1, 9

## Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL. *E. coli* limits as listed above apply year-round, or

the *E. coli* limits shall apply during the recreation period of May – September and a fecal coliform limit of 400 counts/100 mL as a monthly geometric mean shall apply during November - April. Any fecal coliform weekly geometric mean limit which was included in the previous permit for expression of limits purposes does not need to be included in the reissued permit. The facility must contact the Department about which limits are preferred in the permit.

4. This is a technology-based effluent limit (TBEL) as described in s. NR 217.04, Wis. Adm. Code, and serves as an interim limit. The water quality criterion (WQC) of 5 ug/L is described in s. NR 102.06(5)(b), Wis. Adm. Code, for discharges into Lake Superior. This phosphorus WQC is not recommended due to incomplete near shore and/or whole lake modeling that is necessary for the limit. The TBEL will be recommended as the interim limit and should be retained in the reissued permit.
5. Due to technical and economic considerations, the Department granted a mixing zone phase-out exception for mercury, which the interim limit remains equal to the previous 1-day P<sub>99</sub> of 11 ng/L.
6. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance, such as monthly for 1 year during the reissued permit term.
7. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all major municipal major permittees. Total nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total Kjeldahl nitrogen (TKN) (all expressed as N).
8. Annual acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).
9. Annual chronic WET tests are recommended during the reissued permit term. The Instream Waste Concentration (IWC) to assess chronic test results is 9%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Lake Superior out of the confluence of Outfall 001. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

The recommended limits meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, and additional limits are not required.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, discharge area map, & thermal table

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## Water Quality-Based Effluent Limitations for Ashland Sewage Utility

**WPDES Permit No. WI-0030767-10-0**

Prepared by: Michael A. Polkinghorn, E.I.T.

### PART 1 – BACKGROUND INFORMATION

#### Facility Description

The City of Ashland owns and operates a domestic wastewater treatment facility (WWTF). Treatment consists of preliminary treatment using a step screen, secondary treatment via two oxidation ditches operated in parallel, two final clarifiers operated in parallel, and year-round ultraviolet disinfection. Alum is used for chemical phosphorus removal. The WWTF includes a retention basin to handle wet-weather flows in excess of the peak plant capacity. Wastewater collection in the retention basin is pumped back to the plant for treatment after peak flows are over. Effluent is discharged on a continuous basis to a storm sewer that travels to the end of North 29<sup>th</sup> Ave. East and then approximately 1,300 ft north into Chequamegon Bay of Lake Superior.

Attachment #2 is a map of the Outfall 001 location and discharge area.

#### Existing Permit Limitations

The current permit, expiring on 03/31/2022, includes the following effluent limitations and monitoring requirements:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD <sub>5</sub>			45 mg/L	30 mg/L	2
TSS			45 mg/L	30 mg/L	2
pH	9.0 s.u.	6.0 s.u.			2
Fecal Coliform			<b>656#/100 mL geometric mean</b>	400#/100 mL geometric mean	3
Phosphorus Interim				1.0 mg/L	4
Mercury (Total Recoverable)	11.0 ng/L				5
<i>E. coli</i>					1
Ammonia Nitrogen					1
Acute WET					6
Chronic WET					6

Footnotes:

1. Monitoring only.

2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. Additional limit to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, is included in bold.
4. This is a technology-based effluent limit (TBEL) as described in s. NR 217.04, Wis. Adm. Code, and serves as an interim limit. The WQC of 5 ug/L is described in s. NR 102.06(5)(b), Wis. Adm. Code, for discharges into Lake Superior. This phosphorus WQC is not recommended due to incomplete near shore and/or whole lake modeling that is necessary for the limit. The TBEL will be recommended as the interim limit and will be retained in the reissued permit.
5. Due to technical and economic considerations the Department granted a mixing zone phase-out exception for mercury, with a limit set equal to the 1-day  $P_{99}$  of effluent data.
6. The current permit required annual acute and chronic whole effluent toxicity (WET) tests in order to collect seasonal information about the discharge.

### Receiving Water Information

- Name: Chequamegon Bay of Lake Superior (Lake Superior)
- Waterbody Identification Code (WBIC): 2751220
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Cold Water (CW) community, public water supply, and outstanding resource water (ORW).
- Flow: A ten-to-one dilution ratio will be used for calculating effluent limitations based on chronic or long-term impacts, in accordance with s. NR 106.06(4)(b)2, Wis. Adm. Code, because the receiving water does not exhibit a unidirectional flow at the point of discharge. A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.
- Hardness = 45 mg/L as  $\text{CaCO}_3$ . This value represents the geometric mean from WET test data ( $n = 4$ ) from November 2017 – July 2020.
- Source of background concentration data: Metals data from the Bad River and Bois Brule River are used in this evaluation. Those values are shown in the tables in Part 2 below, in the column titled “MEAN BACK-GRD.”. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen and mercury are described later.
- Multiple dischargers: There are several other dischargers to Lake Superior; however, they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: Lake Superior is on the Clean Water Act Section 303(d) list for mercury, polychlorinated biphenols (PCBs), and perfluorinated alkylated substances (PFOS) contamination in fish tissue. These pollutants do not impact the WQBELs due to the concerned concentrations being limited to the fish tissue.

### Effluent Information

- Design flow rate(s):  
Annual average = 1.92 million gallons per day (MGD)  
For reference, the actual average flow from April 2017 – October 2021 was 1.23 MGD.
- Hardness = 231 mg/L as  $\text{CaCO}_3$ . This value represents the geometric mean of data ( $n = 4$ ) submitted in the permit application from April 2021 – May 2021.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable –

Attachment #1

this facility does not have an approved zone of initial dilution (ZID).

- Water source: Domestic wastewater with no industrial contributors.
- Water supply: Ashland Water Utility.
- Additives: Alum is utilized for chemical phosphorus treatment at the WWTF. The water supply utilizes chlorine, fluorine, caustic soda, and phosphorus.
- Effluent characterization: This facility is categorized as a major municipal, so the permit application required effluent sample analyses for all the “priority pollutants” except for the dioxins and furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for ammonia nitrogen and *E. coli* are also used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.
- The chromium (+6) sample provided in the permit application (1.7 µg/L, 05/24/2021) is greater than the value recorded for total recoverable chromium/(+3) (<0.99 µg/L) on the same date, which suggests the chromium (+6) concentration is not representative of Outfall 001. Due to the apparent sampling error, the sample value for chromium (+6) is assumed to also be a nondetect.
- Additional historic effluent arsenics samples (n = 2) from May 2010 – January 2015 are used to better determine the need for arsenic limits in the reissued permit.
- Additional effluent hexachlorobenzene samples (n = 4) from November 2021 – December 2021 were requested by the Department and are used to better determine the need for hexachlorobenzene limits in the reissued permit.

**Arsenic Effluent Data**

Sample Date	µg/L
05/24/2010	<2.4
01/13/2015	<1.0
05/24/2021	0.95
Mean	0.32

**Copper & Chloride Effluent Data**

Sample Date	Copper µg/L	Chloride mg/L
04/06/2021	11	110
04/12/2021	6.6	66
04/16/2021	6.4	69
04/20/2021	8.4	
04/26/2021	8.8	
04/30/2021	7.3	
05/04/2021	8.3	
05/10/2021	8.7	
05/14/2021	12	
05/18/2021	11	
05/24/2021	5.1	62
Mean		77
1-day P <sub>99</sub>	15	
4-day P <sub>99</sub>	11	

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Sample Date	Copper µg/L	Chloride mg/L
30-day P <sub>99</sub>	9.5	

**Hexachlorobenzene Effluent Data**

Sample Date	µg/L
05/24/2021	0.0060*
11/29/2021	<0.69
11/30/2021	<0.69
12/01/2021	<0.69
12/02/2021	<0.69
Mean**	<0.69

“\*” means the sample value is viewed as a possible false detect and is shown for informational purposes. These sample values are excluded from data analysis parameters.

“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

**Mercury Effluent Data**

Sample Date	ng/L
05/25/2017	6.7
07/25/2017	1.2
10/09/2017	2.2
01/31/2018	1.2
04/10/2018	1.6
07/17/2018	1.7
10/24/2018	1.0
01/15/2019	1.6
05/01/2019	1.8
07/16/2019	3.3
10/23/2019	2.4
01/21/2020	1.6
05/05/2020	1.2
07/22/2020	6.2
10/08/2020	10
01/13/2021	4.2
04/21/2021	2.1
07/20/2021	2.8
1-day P <sub>99</sub>	12.1
4-day P <sub>99</sub>	6.8
30-day P <sub>99</sub>	4.1

The following table presents the average concentrations and loadings at Outfall 001 from April 2017 – October 2021 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

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**Parameter Averages with Limits**

	Average Measurement*
BOD <sub>5</sub>	5.7 mg/L
TSS	7.1 mg/L
pH field	6.61 s.u.
Fecal Coliform	25 #/100 mL
Phosphorus	0.65 mg/L
Mercury	2.5 ng/L

\*Results below the level of detection (LOD) were included as zeroes in calculation of average.

## PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99<sup>th</sup> percentile (or P<sub>99</sub>) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling for all the detected substances. All concentrations are expressed in terms of micrograms per liter (µg/L), except for hardness and chloride (mg/L) and mercury (ng/L).

### Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P <sub>99</sub>	1-day MAX. CONC.
Arsenic		340	680	136	0.32		0.95
Copper	231	34.2	68.4			15	12
Mercury (ng/L)		830	1,660			12.1	10
Zinc	231	250	500	100	29		29
Chloride (mg/L)		757	1,514	303	77		110

\* Limits are calculated based on 2 X ATC because they are more stringent than limits based on a 10:1 dilution.

### Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P <sub>99</sub>
Arsenic		148.0		1,628	326	0.32	
Copper	45	5.21		57.3			11



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SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P <sub>99</sub>
Mercury (ng/L)		440		440			6.8
Zinc	45	59.73		657	131	29	
Chloride (mg/L)		395	3.8	4,307	861	77	

**Monthly Average Limits based on Wildlife Criteria (WC)**

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	WC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	30-day P <sub>99</sub>
<b>Mercury (ng/L)</b>	1.3		<b>1.3</b>	<b>4.1</b>

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P <sub>99</sub>
Antimony	5.6		62	12	0.95	
<b>Mercury (ng/L)</b>	1.5		<b>1.5</b>			<b>4.1</b>
Hexachlorobenzene	0.022		0.022	0.0044	<0.69	
Hexachlorocyclo-pentadiene	25.6		282	56.3	0.015	

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	0.2		2.2	0.44	0.32
Chloroform	53		583	117	0.95
Hexachlorobenzene	0.00022		0.00022	0.000044	<0.69

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

**Monthly Average Limits based on Taste & Odor Criteria (TOC)**

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P <sub>99</sub>
Copper	1,000		11,000			9.5
Zinc	5,000		55,000	11,000	29	
Hexachlorocyclo-pentadiene	1		11	2.2	0.015	

### Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are needed for mercury**. The need for additional ammonia nitrogen limits will be evaluated later in this evaluation. Limits and/or monitoring recommendations are made in the following paragraphs below:

Arsenic – Considering available effluent data from May 2010 – May 2021, the mean effluent concentration is 0.32 µg/L. This effluent concentration is below the calculated WQBELs for arsenic. **Therefore, limits are not recommended during the reissued permit term. Monthly monitoring is recommended for 1 year during the reissued permit term to determine the need for limits at the next permit reissuance.**

In addition, the limit of detection of the sample submitted for arsenic is 0.85 µg/L (05/24/2021) using the EPA 200.8 analytical method. The limit of detection of this analytical method is higher than 1/5<sup>th</sup> of the calculated limit (0.44 µg/L) based on HCC and is not necessarily determinate if a nondetect sample is actually lower than that value. **A different approved analytical method is recommended for future samples for arsenic such that the limit of detection is less than or equal to 0.44 µg/L to better determine the need for arsenic limits at the next permit reissuance.**

Copper – Considering available effluent data from the current permit term (April 2021 – May 2021), the 1-day P<sub>99</sub> and 4-day P<sub>99</sub> concentrations of effluent data are 15 and 11 µg/L respectively. These effluent concentrations are below the calculated WQBELs for copper. **Therefore, limits are not recommended during the reissued permit term. However, monthly monitoring is recommended for 1 year during the reissued permit term to determine the need for limits at the next permit reissuance.**

Chloride – Considering available effluent data from the current permit term (April 2021 – May 2021), the mean effluent concentration is 77 mg/L. This effluent concentration is below the calculated WQBELs for chloride. **Therefore, limits are not recommended during the reissued permit term. Monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Hexachlorobenzene – Considering available effluent data from the current permit term (November 2021 – December 2021), the mean effluent concentration is nondetect with a limit of detection of 0.69 µg/L. This is done treating the detect value of 0.0060 µg/L (05/24/2021) as a possible false detect. Note the limit of detection utilized in the 05/24/2021 sample is approximately 4.5 times larger than the monthly average limit of 0.00022 µg/L based on HCC, and 22.7 times larger than 1/5<sup>th</sup> of the limit, for a great lakes discharger.

The commercial production of hexachlorobenzene has been banned in the United States in 1965 and globally in 2004 under the Stockholm Convention on Persistent Organic Pollutants (POPs), with the last known commercial production in the United States ending in 1984. As a POP hexachlorobenzene is resistant to environmental degradation and can be found anywhere in the environment via surface water, groundwater, soil, atmosphere, and in fish and bird of prey species through biomagnification. Although it cannot form in the environment naturally, hexachlorobenzene can be formed as a possible by-product in chloralkali and wood processing industrial waste streams. Industries in the commercial production of chlorinated-based solvents, pesticides, and the burning of chlorinated-based municipal waste also contribute to environmental contamination through atmospheric deposition. This information along with the 4 additional nondetect samples (November 2021 – December 2021) leads to believe that the detect

value of 0.0060 µg/L (05/24/2021) is a possible false detect. **Therefore, no limits are recommended in the reissued permit. Monthly monitoring for 1 year is recommended during the reissued permit term to determine the existence of potential sources of hexachlorobenzene discharging to the sewershed of the Ashland Sewage Utility.**

**Mercury** – The 30-day P<sub>99</sub> of representative data is 4.1 ng/L, which is greater than the most stringent limit (wildlife criterion of 1.3 ng/L); **therefore, a limit is recommended for mercury.**

Ashland Sewage Utility has requested a continued exception to the mixing zone phase out when calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for BCCs at 40 CFR, Part 132, Appendix F, Procedure 3 C. 6. The Department has approved the continuation of the exemption and additional permit requirements are discussed in Part 8 of this memorandum. Section NR 106.145(5), Wis. Adm. Code, specifies that an alternative limitation shall equal the 1-day P<sub>99</sub> of the effluent data and shall be expressed as a daily maximum concentration. Because the 1-day P<sub>99</sub> is 12.1 ng/L from current effluent data (May 2017 – July 2021) is greater than the current interim limit of 11 ng/L, the limit cannot be increased as described in s. NR 106.145(5)(c), Wis. Adm. Code. **Therefore, the alternative mercury limitation of 11 ng/L as a daily maximum is recommended to continue for Ashland Sewage Utility.**

**In the absence of a mercury alternative effluent limit or variance, The WQBEL of 1.3 ng/L (without a mixing zone) along with mass limits and additional concentration limits to meet the expression of limits requirements in s. NR 106.07, Wis. Adm. Code, would be required.**

### **PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN**

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the Ashland Sewage Utility does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

#### **Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

Daily maximum limitations are based on ATC in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The ATC for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.275 and B = 39.0 for a CW Category 1 community,  
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1,675 sample results were reported from April 2017 – October 2021. The maximum reported value was 7.69 Standard pH Units (s.u.). The effluent pH was 7.19 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.36 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.33 s.u. Therefore, a value of 7.36 s.u. is believed to represent the maximum reasonably expected pH, and

therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.36 s.u. into the equation above yields an ATC = 16.13 mg/L. Therefore, the applicable daily maximum limit is 32 mg/L, rounded to two significant figures using 2 X ATC.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

**Daily Maximum Ammonia Nitrogen Limits – CW Category 1**

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

#### **Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**

The acute ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on CTC for ammonia, because those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on CTC in ch. NR 105, Wis. Adm. Code. The 30-day CTC for ammonia in waters classified for a CW category 1 community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or  $1.45 \times 10^{(0.028 \times (25 - T))}$ ,

T = the temperature (°C) of the receiving water

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used to derive weekly average limitations, and the 30-day criteria are used to derive monthly average limitations, both by a mass-balance using a ten-to-one dilution ratio.

Background ammonia nitrogen values used are averages based on surface water data from the Lake Superior basin. Background pH values used are based on the background hardness for Lake Superior. Background maximum temperature values are surface waterbody-specific for Chequamegon Bay taken from the namesake column of Table 5 of ch. NR 102, Wis. Adm. Code. Background parameters and calculated limits are included in the table below:

**Weekly & Monthly Ammonia Nitrogen Limits – CW Category 1**

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	1.92	1.92	1.92
Background Information	Dilution	10:1	10:1	10:1
	Ammonia (mg/L)	0.03	0.03	0.025
	Maximum Temperature (°C)	11	19	9
	pH (s.u.)	7.66	7.84	7.46
Criteria mg/L	4-day Chronic	9.34	5.67	11.24
	30-day Chronic	3.74	2.27	4.50
Effluent Limits mg/L	Weekly Average	100	62	120
	Monthly Average	41	25	49

**Effluent Data**

The following table shows the 4 samples for ammonia nitrogen taken February 2018 – October 2018, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Ashland Sewage Utility permit for the respective month ranges. Because there are less than 11 detect samples available, the mean of effluent data is compared to 1/5<sup>th</sup> of the effluent limits.

**Ammonia Nitrogen Effluent Data**

Sample Date	mg/L
02/06/2018	0.059
04/03/2018	0.069
07/03/2018	0.027
10/03/2018	0.082
Mean	0.059

The lowest of the 1/5<sup>th</sup> of the limit values is 5.0 mg/L, which is from the applicable monthly average limit for June – September. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **Therefore, limits are not recommended during the reissued permit term. Monitoring is recommended during the reissued permit term to determine the need for limits at the next permit issuance.**

#### **PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA**

On May 1, 2020, revisions to chs. NR 102 and 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

*E. coli* monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because the Ashland Sewage Utility's permit requires weekly monitoring, the 410

counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May – September. No changes are recommended to the current recreational period and the required disinfection season.

The current permit requires the Ashland Sewage Utility to disinfect year-round for protection of the public water supply, because the drinking water intake for the City of Ashland is located approximately 3,000 – 3,500 ft from the outlet of Bay City Creek. This is approximately 1.6 mi west of Outfall 001. Because the *E. coli* limits listed in NR 210.06(2)(a)1, Wis. Adm. Code, are set for protection of recreational uses and not drinking water supply, these *E. coli* limits do not necessarily need to be applied year-round. However, either *E. coli* or fecal coliform bacteria limits are needed year-round in order to ensure that there is no reduction from the current level of disinfection needed to protect the public drinking water source.

In accordance with s. NR 210.06(2)(a)2, Wis. Adm. Code, outside of the recreational season, bacteria limits may either be set equal to the previous fecal coliform limits or the listed *E. coli* limits. Therefore, the facility can select one of the two possible sets of permit limits:

- ***E. coli* limits as listed above during the recreation period of May – September and a fecal coliform limit of 400 counts/100 mL as a monthly geometric mean in November - April. Any fecal coliform weekly geometric mean limit which was included in the previous permit for expression of limits purposes does not need to be included in the reissued permit.**
- ***E. coli* limits as listed above apply year-round.**

#### **Effluent Data**

Ashland Sewage Utility has monitored effluent *E. coli* from April 2017 – October 2021 and a total of 240 results are available. A geometric mean of 126 counts/100 mL was exceeded in 2 out of the last 55 months, with a maximum monthly geometric mean of 136 counts/100 mL. Effluent data has exceeded 410 counts/100 mL 12 times (which is 5.0 % of the total sample results). The maximum reported value was 2,420 counts/100 mL. **Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.**

## **PART 5 – PHOSPHORUS**

#### **Technology-Based Effluent Limit**

Subchapter II of ch. NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

**Because Ashland Sewage Utility currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.** In addition, the need for a WQBEL for phosphorus must be considered.

#### **Water Quality-Based Effluent Limits**

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for

surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(5)(a), Wis. Adm. Code, specifies a total phosphorus criterion of 5 µg/L (0.005 mg/L) for the open and nearshore waters of Lake Superior. For discharges directly to the Great Lakes, s. NR 217.13(4), Wis. Adm. Code, says that the Department shall set effluent limits consistent with nearshore or whole lake models approved by the Department. At this time, there is no model available. According to phosphorus implementation guidance, an interim limit should be set at a level that is achievable and that makes progress toward phosphorus reductions without the investment of temporary treatment or a compliance schedule to meet the interim limit. In the absence of an approved model, a WQBEL of 0.6 mg/L as a six-month average would be recommended. This limit is indicative of the best readily available phosphorus removal technology at the time this rule was promulgated in 12/01/2010.

### Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2017 – October 2021.

**Total Phosphorus Effluent Data**

	Phosphorus mg/L
1-day P <sub>99</sub>	1.6
4-day P <sub>99</sub>	1.1
30-day P <sub>99</sub>	0.79
Mean	0.65
Std	0.30
Sample size	238
Range	0.17 - 1.7

### Interim Limit:

An interim limit is required per s. NR 217.17 when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional “temporary” treatment, but also should prevent backsliding from current conditions. **Therefore, it is recommended that the TBEL of 1.0 mg/L as a monthly average remain as the interim limit in the reissued permit along with requirements for optimization of phosphorus removal.** The TBEL was exceeded 6 times or 11% of the time from April 2017 – October 2021. In addition, the 0.6 mg/L as a six month average would have been exceeded 28 times or 56% of the time from September 2017 – October 2021.

The *Guidance for Implementation of Wisconsin’s Phosphorus Water Quality Standards* states that facilities discharging to the Great Lakes will be required to optimize facility operations upon permit reissuance. During the permit term, the facility has carried out optimization efforts as part of the phosphorus compliance schedule. The facility should continue the measures in their optimization plan until a near-shore or whole lake model allows for the calculation of a WQBEL.

## **PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL**

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

The lowest calculated limitation is 120° F as a daily maximum using the procedure in s. NR 106.55(7), Wis. Adm. Code, for a Lake Superior off – shore discharge. The complete calculations are included as attachment #3. Temperature monitoring was not required during the current permit term. At temperatures above approximately 103° F, conventional biological treatment systems do not function properly and experience upsets. There is no indication that this has ever occurred in this treatment system. Therefore, there is no reasonable potential for the discharge to exceed this limit. **Temperature limits or monitoring are not recommended during the reissued permit term.**

## **PART 7 – WHOLE EFFLUENT TOXICITY (WET)**

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC<sub>25</sub> (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC is 9% based on dilution of 10 parts lake water to 1-part effluent, as specified in s. NR 106.06(4)(b)2, Wis. Adm. Code, or a factor of 1 in 11 to calculate the IWC.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in



Attachment #1

chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Therefore, available WET data after June 2005 is shown in the table below:

**WET Data History**

Date Test Initiated	Acute Results LC <sub>50</sub> % (% survival in 100% effluent)				Chronic Results IC <sub>25</sub> %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
08/16/2005	NA	NA	NA	No	NA	NA	NA	No	1
09/19/2006	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/12/2006					>100	NA	Pass	No	1
05/08/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
01/15/2008					>100	>100	Pass	Yes	
02/16/2010					>100	>100	Pass	Yes	
02/12/2012	>100	>100	Pass	Yes					
10/02/2012	>100	>100	Pass	No					2
10/02/2012	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/01/2016	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/06/2017	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/22/2018	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
05/20/2019	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/27/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/16/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Footnotes:

- Qualified or Inconclusive Data.* Data quality concerns were noted during testing which calls into question the reliability of the test results.
  - Split Samples.* Tests were conducted concurrently on the same effluent samples by two different labs, as a check on lab performance or sampling procedures. Split samples cannot be double counted.
- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable reasonable potential equation results in a value greater than 1.0.

Attachment #1

Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]

Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC<sub>50</sub>, IC<sub>25</sub> or IC<sub>50</sub> ≥ 100%).

**Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.**

**Chronic Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.**

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: <https://dnr.wisconsin.gov/topic/Wastewater/WET.html>.

**WET Checklist Summary**

	<b>Acute</b>	<b>Chronic</b>
<b>AMZ/IWC</b>	Not Applicable. <b>0 Points</b>	IWC = 9%. <b>0 Points</b>
<b>Historical Data</b>	Ten tests used to calculate RP. No tests failed. <b>0 Points</b>	Eleven tests used to calculate RP. No tests failed. <b>0 Points</b>
<b>Effluent Variability</b>	Little variability, no violations or upsets, consistent WWTF operations. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Receiving Water Classification</b>	Lake Superior or ORW. <b>15 Points</b>	Same as acute. <b>15 Points</b>
<b>Chemical-Specific Data</b>	No reasonable potential for limits based on ATC; Arsenic, copper, mercury, zinc, and chloride detected. Additional Compounds of Concern: Antimony, hexachlorobenzene, Hexachlorocyclo-pentadiene, and chloroform. <b>5 Points</b>	No reasonable potential for limits based on CTC; Arsenic, copper, mercury, zinc, and chloride detected. Additional Compounds of Concern: Antimony, hexachlorobenzene, Hexachlorocyclo-pentadiene, and chloroform. <b>5 Points</b>
<b>Additives</b>	No biocides and 1 water quality conditioners added. P treatment chemical other than Ferric Chloride (FeCl), Ferrous Sulfate (FeSO <sub>4</sub> ), or alum used: No. <b>1 Point</b>	All additives used more than once per 4 days. <b>1 Point</b>

	<b>Acute</b>	<b>Chronic</b>
<b>Discharge Category</b>	No industrial contributors. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Wastewater Treatment</b>	Secondary or better. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>21 Points</b>	<b>21 Points</b>
<b>Recommended Monitoring Frequency (from Checklist):</b>	Two tests during permit term (year 2, 4, 6, etc.)	Two tests during permit term (year 2, 4, 6, etc.)
<b>Limit Required?</b>	No.	No.
<b>TRE Recommended? (from Checklist)</b>	No.	No.

- **A minimum of annual acute and chronic monitoring is recommended because the Ashland Sewage Utility is a major municipal discharger with a design flow greater than 1.0 MGD.** Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

#### **PART 8 – MIXING ZONE PHASE-OUT EXCEPTION FOR MERCURY**

Ashland Sewage Utility has requested a continued exception to the mixing zone phase out when calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for bioaccumulating chemicals of concern (BCC's) (see 40 CFR, Part 132, Appendix F, Procedure 3 C. 6). In consideration of the requirements contained at the above reference, the Department determines that:

- Ashland Sewage Utility is in compliance with and shall continue to comply with all applicable requirements of Clean Water Act sections 118, 301, 302, 303, 304, 306, 307, 401, and 402, including existing categorical effluent limits and WQBELs.
- Ashland Sewage Utility will accept a permit compliance schedule requiring the development and implementation of a Mercury Pollution Minimization Plan (PMP) meeting the requirements of s. 106.145(7), Wis. Adm. Code. The Department believes the finding at s. 106.145(1)(a), Wis. Adm. Code, sufficiently demonstrates that controls beyond a PMP would result in unreasonable economic effects because controls to remove mercury using wastewater treatment technology are not feasible or cost-effective for this facility.
- Ashland Sewage Utility discharges directly to Lake Superior.
- The previous WQBEL addendum (March 2016) utilizes a background mercury concentration of 0.5 ng/L based on intake data from the Bayfront power plant in Ashland, WI. The source of this background data could not be confirmed so it is not used in this evaluation. Background data from the City of Ashland water intake (n = 26, February 1977 – February 1979) is used instead

Attachment #1

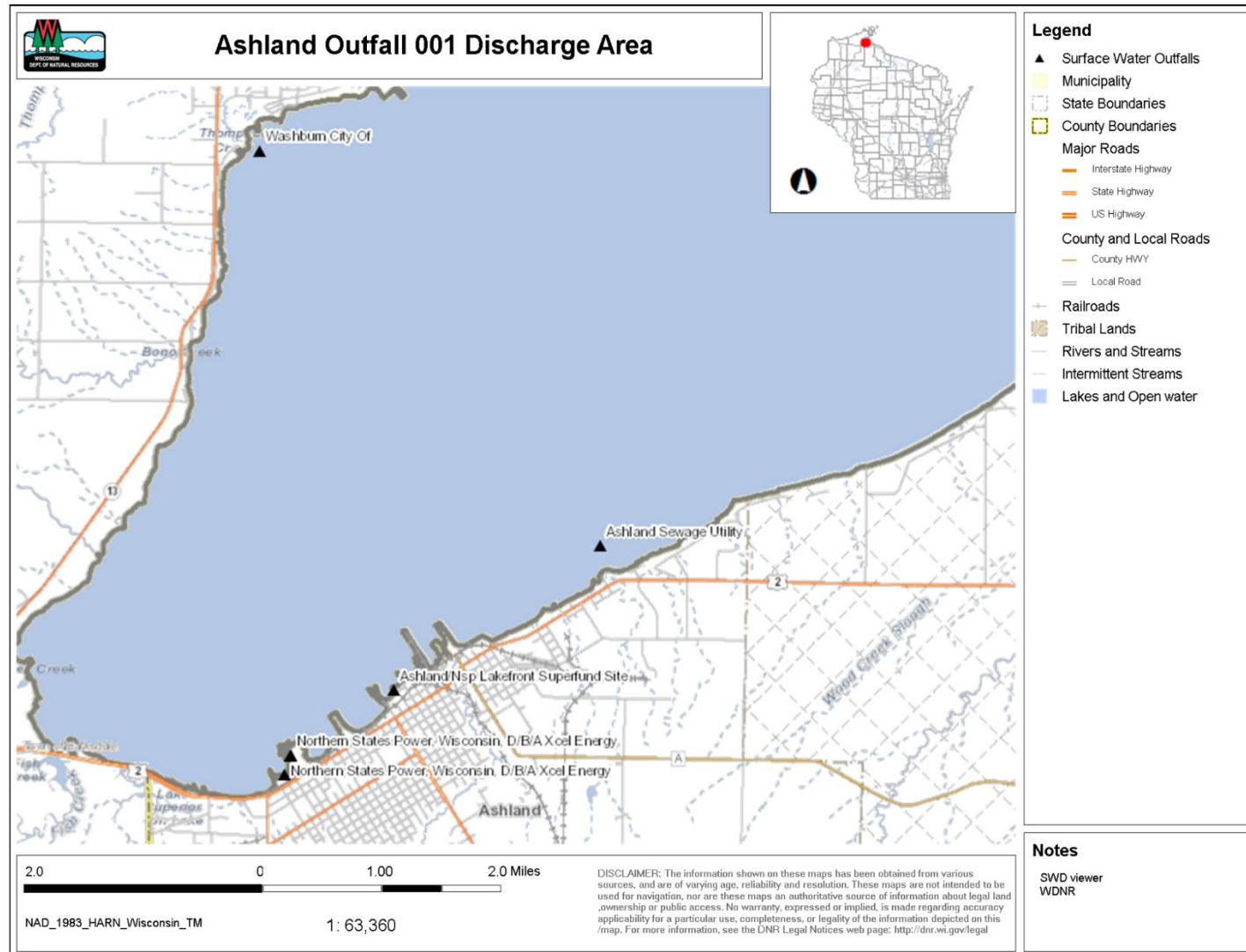
where all the samples are equal to 0.2 ng/L, most likely equal to the best readily available limit of detection at that time. Therefore, the representative background mercury concentration for Lake Superior in the area of Chequamegon Bay is set equal to the level of detection of 0.2 ng/L.

- The discharger has reduced and will continue to reduce, to the maximum extent possible, its discharge of the BCC for which the mixing zone is requested. The mixing zone shall be no larger than necessary to account for the technical constraints and economic effects identified pursuant to this exception. Therefore, the mixing zone shall be set at 2.5:1 based on the 30-day  $P_{99}$  of discharge 4.1 ng/L, the criterion of 1.3 ng/L, and a background concentration of 0.2 ng/L at the facility design flow of 1.92 MGD. The mixing zone allowed during the current permit is 3.3:1 for informational purposes.
- The limit shall remain at 11 ng/L with quarterly monitoring.
- The water quality criteria are met at the edge of the mixing zone.
- There is currently no applicable TMDL for mercury in Lake Superior and available data indicate the concentration of mercury in Lake Superior meets all applicable water quality criteria.
- Other actions in Wisconsin to reduce releases of mercury include rules to control emissions from utility boilers and proposed mercury product legislation.
- This mixing zone and resulting QBELs meet the requirements at 40 CFR, Part 132, Appendix F, Procedure 3 D., including that the actions will not jeopardize the continued existence of endangered or threatened species. The requirements for authorizing the exception and the circumstances under which it is being granted are essentially the same as those for granting a variance to water quality standards. The Department has analyzed the potential impacts to endangered and threatened species as part of its variance process. The analysis concluded that approval of mercury variances, with more stringent permit requirements for PMPs, is unlikely to adversely affect bald eagles or other listed species that occur within the State of Wisconsin.

Therefore, the Department grants a mixing zone extension for effluent discharges from the wastewater treatment facility operated by the Ashland Sewage Utility due to technical and economic considerations.

The granting of this exception to the Ashland Sewage Utility shall apply only to the 5-year permit term of the proposed WPDES permit. The permittee will need to make a similar request and the Department will need to make a similar determination for a further continuation of a mixing zone, if those actions become appropriate for the next permit term.

Attachment #2



### Temperature Limits for Receiving Waters without Unidirectional Flow

(calculation using default ambient temperature data)

<b>Facility:</b>	Ashland Sewage Utility	<b>Lake Type:</b>	Lake Superior ▼	<b>Flow Dates</b>	
<b>Outfall(s):</b>	001	<b>Discharge Type:</b>	Great Lakes off-shore discharge ▼	<b>Start:</b>	04/01/17
<b>Date Prepared:</b>	11/29/2021				
<b>Design Flow (Qe):</b>	1.92	MGD			
			<b>Maximum area of mixing zone allowed (coefficient "A"):</b> 3,141,593 ft <sup>2</sup>		

Month	Water Quality Criteria			Representative Highest Effluent Flow Rate (Qe)					Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC	7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)	B	e <sup>-a</sup> (for SL-WQBEL)	e <sup>-a</sup> (for A-WQBEL)	Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(MGD)	(MGD)				(°F)	(°F)	(°F)	(°F)
JAN	35	41	69	1.97	2.90	0.405	0.000	0.000	0	0	NA	120
FEB	34	46	69	0.96	1.12	0.405	0.000	0.000	0	0	NA	120
MAR	34	51	69	3.08	4.15	0.405	0.000	0.000	0	0	NA	120
APR	35	57	69	3.61	4.12	0.405	0.000	0.000	0	0	NA	120
MAY	41	63	70	3.52	4.13	0.405	0.000	0.000	0	0	NA	120
JUN	49	69	72	3.40	4.62	0.405	0.000	0.000	0	0	NA	120
JUL	55	72	73	2.16	3.55	0.405	0.000	0.000	0	0	NA	120
AUG	57	71	73	2.31	3.74	0.405	0.000	0.000	0	0	NA	120
SEP	57	64	73	2.60	3.35	0.405	0.000	0.000	0	0	NA	120
OCT	50	55	72	3.44	4.10	0.405	0.000	0.000	0	0	NA	120
NOV	43	45	70	1.76	2.47	0.405	0.000	0.000	0	0	NA	120
DEC	38	42	69	2.49	4.16	0.405	0.000	0.000	0	0	NA	120